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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,918	10/05/2005	Hirokazu Asahara	AI 391NP	6223

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EXAMINER	
REAMES, MATTHEW L	
ART UNIT	PAPER NUMBER
2893	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,918	ASAHARA ET AL.	
	Examiner	Art Unit	
	Matthew Reames	2893	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/27/2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-9 and 12-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-9 and 12-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1-2, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haltz in view of Takeuchi (20030052323).

a. As to claims 1 and 6, Haitz teaches a semiconductor light emitting device comprising: a semiconductor light emitting portion (e.g. fig 4) ; a front surface electrode provided on one side of the semiconductor light emitting portion (see e.g. figs. 1 and 4); an electrically conductive substrate provided on the other side of the semiconductor light emitting portion (see e.g. fig. 4), the electrically conductive substrate being transparent to a wavelength of light emitted from the semiconductor light emitting portion (see e.g. fig 4); a rear surface electrode having a pattern in ohmic contact with a first region of a back surface of the electrically conductive substrate opposite from the semiconductor light emitting portion (see e.g. fig. 4 the ohmic electrode) ; and a rear surface insulation layer covering a second region of the back surface of the electrically conductive substrate other than the first region, the rear surface insulation layer being

transparent to the wavelength of the light emitted from the semiconductor light emitting portion (see e.g. fig. 4 dielectric layers). Haltz further teaches the electrodes may be formed in many shapes including an annular ring which constitutes a continuous line (see column 5 last paragraph).

Haltz therefore teaches patterned electrode on the reflecting side. Haltz does not appear to teach hexagonal shaped honeycomb electrode.

Takeuchi teaches a hexagonal line shaped electrode (see e.g. item 7e fig. 9(e)).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the metal electrode in a hexagonal honeycomb pattern as taught by Takeuchi.

One would have been so motivated in order to provide better current spreading and prevent current crowding increasing device efficiency.

b. As to claim 2, Haitz teaches an electrical reflective layer on the back of the dielectric ohmic contact region (see reflective metallization) where the ohmic contacts are absorbing (see summary).

3. Claims 3, 4, 13, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haitz/Takeuchi in view of Slater (2003/0045015) in further view of Liu (6,919,585).

a. As to claim 3, Haitz teaches a GaP LED which is greenish color.

Haitz does not teach a SiC substrate.

Slater teaches a SiC substrate in use with GaN LEDs (see e.g. fig. 1). Further Liu teaches that by optimizing the conductivity of the SiC affect lattice matching and index of refraction of the SiC. Liu teaches a SiC of 0.09 ohms or greater.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the reflector of Haitz in conjunction with a GaN based LED of Slater on a 0.05 ohm-cm-0.5 ohm-cm SiC substrate.

One would have been so motivated to increase light emission from the LED of Slater, thus making the LED brighter and providing better lattice matching and better control of index of refraction.

b. As to claim 4, Haitz does not teach a transparent oxide for the front electrode.

However transparent oxide electrodes where known in the art to allow increased light emission and current spreading.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the front electrode from a transparent conductive oxide.

One would have been so motivated in order to increase light emission and to provide better current spreading.

c. As to claim 13, Haitz teaches an electrical reflective layer on the back of the dielectric ohmic contact region (see reflective metallization) where the ohmic contacts are absorbing (see summary).

d. As to claim 14, Haitz does not teach a SiC substrate.

Slater teaches a SiC substrate in use with GaN LEDs (see e.g. fig. 1). Further Liu teaches that by optimizing the conductivity of the SiC affect lattice matching and index of refraction of the SiC. Liu teaches a SiC of 0.09 ohms or greater.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the reflector of Haitz in conjunction with a GaN based LED of Slater on a 0.05 ohm-cm-0.5 ohm-cm SiC substrate.

One would have been so motivated to increase light emission from the LED of Slater, thus making the LED brighter and providing better lattice matching and better control of index of refraction.

d. As to claim 15, Haitz does not teach a transparent oxide for the front electrode.

However transparent oxide electrodes where known in the art to allow increased light emission and current spreading.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the front electrode from a transparent conductive oxide.

One would have been so motivated in order to increase light emission and to provide better current spreading.

4. Claim 7-9,12, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haitz in view of Slater in view of further view of Liu as provided in claim 3 and 4 in further view of Takeuchi.

a. As to claims 7-9, 12,16, and 17, Haitz/Slater/Liu teaches a GaN based LED on a SiC substrate with a patterned electrode as per claim 3 and 4 which comprises the resitivity properties of claim 3 and the transparent electrode properties claim 4.

Slater further teaches an Ag epoxy (the same blazing material described in applicant specification see e.g. item 26). Since the material and the structure is the same the device must have the same reflective properties as claimed.

Haitz/Slater/Liu does not appear to teach the electrode pattern or a transparent conductive oxide.

Takeuchi teaches forming conductive lines In the shape of a honey comb pattern (see e.g. fig 9e)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the metal electrode in a hexagonal honeycomb pattern as taught by Takeuchi.

One would have been so motivated in order to provide better current spreading and prevent current crowding increasing device efficiency.

Takeuchi further teaches using transparent conductive oxides as an electrode to increase light emission

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the front electrode from a transparent conductive oxide.

One would have been so motivated in order to increase light emission and to provide better current spreading.

Response to Arguments

5. Applicant's arguments filed 8/27/2008 have been fully considered but they are not persuasive. Applicant argues Takeuchi does not teach a honeycomb shaped electrode on the reflecting side only on the emission side. This is not found convincing Haitz does teach a pattern structure on the reflecting side which maybe ellipses, squares, annular rings (see e.g. column 5). These shapes are similar to figures 3 and 9 of Takeuchi. Therefore since the purpose of both Takeuchi and Haitz is to simultaneously electrical contact area with the area left exposed for openings for light to be transmitted or reflected. Therefore the electrode structures of Takeuchi are relevant to the electrode structures of Haitz.

6. Therefore all rejections are deemed proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Reames whose telephone number is (571) 272-2408. The examiner can normally be reached on M-Th 6:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on (571)272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MLR/

/Jack Chen/

Primary Examiner, Art Unit 2893